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The purpose of this study was to develop equivalent forms of restricted association tests for different languages and to test their applicability. Twenty-four (12 male, 12 female) native speakers of each of the following languages were tested: English, German, French, Spanish, Japanese, and Chinese. Most were graduate students at the University of Michigan or Michigan State University. The same seven types of restricted associations to the same 35 stimulus nouns were obtained in all languages. Written tests were administered individually with self-explanatory instructions in the language of the test. There was no time limit. The seven restricted association tasks were to give (1) class names for stimulus words, (2) another member of the class to which the stimulus belonged, (3) synonyms, (4) antonyms, (5) verbs denoting usage of the stimulus, (6) adjectives denoting qualities, and (7) parts or attributes of the stimulus. The results indicate that restricted association tests can be successfully adopted for use in foreign languages and that the results will indicate marked response variability between individuals as well as between languages. Since the numbers of subjects within the groups were rather small and since most subjects were recruited on a university campus, the study must be regarded as preliminary. (DO)

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Department of Psychology

Comparison of Restricted Associations Among Six Languages

by

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Comparison of Restricted Associations Among Six Languages

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The purpose of the following study was to develop equivalent forms of restricted association tests for different languages and to test their applicability. Since the numbers of Ss within the groups are rather small and since most Ss have been recruited on a university campus, the study has to be regarded as preliminary. For more comprehensive comparisons, speakers ought to be tested in their native countries and the number of Ss ought to be increased in order to prevent the results from being attributed to variations in the sample compositions rather than to differences in linguistic habits.

Procedures

Subjects: Twenty-four Ss each were recruited within the following linguistic groups: English (American), German, French, Spanish, Japanese, and Chinese. Thus, 48 Ss each represented Germanic, Romance or Far Eastern Languages respectively. Most Ss lived in Ann Arbor, Michigan, but were native speakers of the above languages. Seventeen of the Chinese Ss lived in East Lansing, Michigan. Ss' ages ranged from 18 to 34 years.

Twelve Ss in each group were males and twelve were females. Most of them (78%) were foreign graduate students in different departments at the University of Michigan or at Michigan State University or they were wives of graduate students. The others were undergraduate students, secretaries, research workers or junior staff members. The Americans were first or second year graduate students in Psychology or in joint programs of Psychology and other disciplines.

Twenty of the German Ss came from Germany, three from Austria and one from Switzerland. The French group included five Belgians, two Ss from Algeria, and one each from

Morocco and Tunisia. Most of the Spanish speaking Ss came from South America; ten were from Venezuela, five from Argentina, three from Costa Rica and two each from Cuba, Mexico and Spain. All Japanese Ss were born in Japan. The Chinese came either from Taiwan or Hong Kong, but many of them were born on the Chinese mainland.

Materials: The paper and pencil tests were administered individually with self-explanatory instructions in the six languages and without time limits. The translations were prepared by native speakers of these languages and with the aid of various staff members in different language departments at the University of Michigan.

Each test consisted of seven pages with 35 common noun stimuli selected from the Kent-Rosanoff word association test (1910). Two different orders of the stimuli were used in equal proportions for each language. Seven types of restricted association tasks were randomly assigned to these pages of the test booklets. Furthermore, two test forms were used for all but the English and Japanese languages. Each form was administered to twelve randomly selected Ss of the four non-English groups, the two forms differed in that they included one of two different translations of the last five of the following stimuli:

table	fruit	window	cabbage	head	tobacco	stomach
man	butterfly	spider	lamp	whiskey	moon	boy
mountain	chair	carpet	bread	child	street	city
house	woman	girl	sheep	thief	king	square
hand	river	soldier	cottage	bed	cheese	doctor

Instructions: The following are the verbatim instructions for the English version of the test.

> The following are tasks of restricted associations. You have received seven pages with 35 stimuli on each page. Keep the pages in the order in which they were given to you and answer each question in the indicated order. On top of each page you will find a particular title. This title denotes the task you are supposed to perform. The following are explanations of the tasks.
>
> Superordinates:
> Find a class-name for the stimulus. For instance, class-names for FORK are: SILVERWARE or UTENSIL. Class-names for LIMOUSINE are: CAR or VEHICLE.
>
> Coordinates:
> Name another member of the class to which the stimulus belongs. For instance, SPOON and KNIFE belong to the same class as FORK. TRAIN or BIKE belong to the same class as CAR.

Similars:
Find a word that means essentially the same as the stimulus. For instance RAKE or BRANCH may be regarded as similars to FORK. AUTO or AUTOMOBILE may be regarded as similars to CAR.

Contrasts:
Find a word that means essentially the opposite of the stimulus. For instance KNIFE or SPOON may be regarded as contrasts to FORK. FOOLISHNESS or STUPIDITY may be regarded as contrasts to WISDOM.

Functions (Verbs):
Find a word that denotes the usage of the stimulus. For instance a FORK is used to EAT or TAKE-UP. CAR is used to TRAVEL or DRIVE.

Qualities (Adjectives):
Find a word that denotes a quality of the stimulus. For instance a FORK is POINTED or HEAVY. A CAR is FAST and SHINY.

Parts:
Name an essential part or attribute of the stimulus. For instance essential parts of a FORK are the HANDLE or the METAL. Essential attributes of WISDOM are EXPERIENCE and MATURITY.

Do not omit any item, respond to the stimuli in the order in which they are presented to you and use only single words for each response. Keep your instruction sheet on the desk and use it for consultations.

Results and Discussion

Blanks: S's failure to respond is indicative of his difficulty in following specific instructions for specific stimuli. However, the instructions provide only general directions and do not prevent an S from choosing responses that are only remotely related to the stimuli. Thus, S's failure to respond is also indicative of his task attitude and the limits he has imposed upon his performance.

The records for the six languages vary somewhat in their completeness. They are most complete for the Americans (99%) and Chinese (98%); they are least complete for Japanese (93%). The remaining languages vary but little (German 97%; French 96% Spanish 97%).

Speakers of all languages had the greatest difficulties with Contrasts (average: 94%). Speakers of all but the English language also had difficulties with Similars (Americans 98%; average of other languages: 92%). Each of the remaining tasks was more than

98% complete. If the records are combined by language families, the differences become still less marked (Germanic: 98%; Romance: 97%; Far Eastern: 96%).

With the exception of the Similars and Contrasts, none of the percentages are large enough to influence, to any serious extent, the results obtained with the other measures. Unfortunately, both Similars and Contrasts are of special interest for cross-linguistic comparisons of multiple meanings and ambiguities of translations. However, in our analysis of these problems in the last section below, we will use methods that, generally, are independent of variations in the percentage of omissions.

Types: The number of different responses is dependent upon the kind of restrictions imposed in the tasks. In some cases many appropriate responses, such as words denoting qualities, may be available in a language. The same result can be produced, however, when the number of appropriate responses, such as for Contrasts, is small. In this case Ss may feel compelled to use less appropriate responses, a behavior which would yield many different responses, coupled with large numbers of blanks. The number of different responses is also dependent upon the sample size of words and/or Ss. Generally, the relative number of different responses, the type-token ratio (TTR), decreases with increasing sample size.

Insert Table 1 and Figure 1 about here

As shown in Table 1, the average TTRs for the Germanic languages are lowest and those for the Romance languages are of intermediate magnitude. The TTRs for the two Far Eastern languages deviate from one another but, on the average, are higher than those of the Germanic languages.

Figure 1 indicates the interactions between the seven tasks and the language families. The fluctuations in TTRs between the tasks are roughly parallel between the Germanic and the Romance languages with the exceptions of the Coordinates, Similars and Superordinates which are farther apart than the TTRs of the remaining four tasks.

For the ("infralogical") tasks of Parts, Functions and Qualities, the TTRs of the Far Eastern languages are parallel to those of both the Romance and the Germanic languages, though consistently higher. With the exception of the Contrasts which attain the lowest TTR among the seven tasks, the trend of the TTRs on the remaining ("logical") tasks seems to be parallel to that of the Germanic languages, though again, higher. Thus the task of finding opposites to common nouns, which proved especially difficult in the Germanic languages (highest numbers of blanks), seems to be relatively less ambiguous in the Far Eastern languages. On Coordinates, Contrasts and Superordinates the variability of the Far Eastern languages is lower than of the Romance languages.

Response Overlaps: Most Ss are unable to respond to a given stimulus with a different word under all seven instructions. Most Ss repeat themselves and the amount of repetition, response overlap, is a function of their own conceptual clarity, as well as that of the language in which they reply. The amount of response repetition decreases with age and education (Riegel, Riegel, Smith, and Quarterman, 1964) and with second language proficiency (Riegel, Ramsey and Riegel, 1967; Riegel and Zivian, 1967).

The response overlaps are determined by counting for each S the number of identical responses given to the same stimulus under the seven instructions. However, instead of analyzing the seven-by-seven matrices thus obtained, we will disregard the single overlaps between any two tasks and, most of the time, will restrict our discussion to the sum of overlaps of any one task with the remaining six.

Insert Table 2 and Figure 2 about here

As shown in the last line of Table 2, the average sums of overlaps are lowest for French and English and highest for Chinese and Spanish. Since still higher sums have been observed for American undergraduates (Riegel, Riegel, Smith, and Quarterman, 1964), the variation between the six groups may be determined by differences in education as much as it is determined by differences between the languages. While this argument can be rejected only if the groups were perfectly matched in educational status (an objective

which may be hard if not impossible to attain in cross-cultural studies), it becomes less valid if the covariations rather than the absolute amounts of overlaps for the seven tasks are compared between the six groups and if language families rather than individual languages are compared.

As shown in Figure 2, Romance and Germanic languages have about equally high overlaps for Coordinates, Similars and Contrasts. Far Eastern languages, however, attain still higher values and thus reveal special conceptual difficulties in differentiating between these three tasks. In particular, an inspection of the complete overlap matrices shows unusually high correlations between Similars and Contrasts for Chinese and between Coordinates and Contrasts for Japanese. On the remaining four tasks of Superordinates, Parts, Functions, and Qualities the overlap of the Romance languages matches that of the Far Eastern languages, whereas the scores for the Germanic languages are much lower.

The sums of overlaps for English and Spanish covary rather systematically with one another, the coefficients for the latter being, however, systematically about 10 percent above the former. The overlaps for English, French, German, and, to a lesser extent, for Japanese, match each other closely in magnitude on the tasks of Superordinates, Parts, Functions, and Qualities. However, German and Japanese deviate toward higher values (show lower conceptual distinctions) for Coordinates, Similars and Contrasts, while French tends toward lower values on these tasks (shows greater conceptual distinctions). In many instances the sums of the overlaps for Spanish and Chinese match each other closely.

While these comparisons do not lend themselves readily to simple interpretations, all differences in the sums of overlaps between the languages except for Superordinates and Parts were found to be statistically significant ($p < .01$).

Shared Responses to Alternate Translated Stimuli: For the translation of five English stimuli two alternate words were used in four of the other five languages and were each given to half of the Ss. Intuitively, some of these alternate translated stimuli appear to be close synonyms, others deviate in meaning. The purpose of this part of our investigation was to evaluate the substitutability of these words and to analyze its variation between languages.

Insert Table 3 about here

The upper section of Table 3 lists the percentages of shared responses to the alternate translated stimuli when summed over the seven types of restrictions. The German equivalents to BOY, i.e., JUNGE and KNABE, have the highest percentage, and thus, seem to be equally good translations of the English stimulus. Cells with low percentages, such as those for SQUARE, indicate lack of substitutability or inappropriate translations. In the present situation the former seems to be the case, since the double meaning of SQUARE in English (as "geometrical figure" and as "public place") are expressed by two distinct words in all other languages.

In the lower section of Table 3, the results are averaged over the five pairs of stimuli but separated by tasks. These percentages add up to 100 within the columns and indicate the relative contributions of the tasks to the amount of similarity in meaning or substitutability of the alternate translated stimuli. For all languages except French, similarity in meaning is most strongly based on common Functions. For German and French, similarity in meaning is more strongly based on "logical" relations than for Spanish and, especially, Chinese; the sums of the first four percentages in each column of Table 3, representing these relations, are high. For Spanish and, especially, Chinese, similarity in meaning is more clearly based on "infralogical," physical relations; the sums of the last three percentages of each column are high. Contrasts are exceptionally strong indicators of substitutability for German and Chinese, Similars and Superordinates for French and Spanish, and Parts for Chinese.

Conclusions

The main purpose of the present study was to test the applicability of restricted association tests in different languages. Since most Ss were recruited on the campus of the University of Michigan they may constitute groups comparable with one another on such

variables as intelligence or educational status but it is uncertain whether they represent equivalent samples of the populations of their native countries. With the possible exception of the Spanish Ss, most of whom came from South America, the foreign groups are likely to be composed of Ss about as highly selected as the group of American Graduates. Since many of the measures obtained have been found to vary with age and education (Riegel, Riegel, Smith and Quarterman, 1964) the present findings can not be generalized readily to other sections of the populations.

The foreigners showed less ease and test sophistication than American students. Their proportions of blanks were higher even though not high enough to prevent further analyses of the data. For all languages the proportions of blanks were highest for Similars and Contrasts. If stimuli other than nouns had been used, this result might have been different.

Like the results of several previous studies on free associations (Levi, 1949; Lambert, 1956; Lambert and Moore, 1966; Rosenzweig, 1957, 1964; Kolers, 1963), the average response variability was lowest for American Ss. In contrast to the findings of Russell and Meseck (1959), however, the response variability in German was as low as in English. Low response variability is indicative of ease in test taking as well as of a high communality in school standards and a high degree of intracultural communication (Jenkins and Russell, 1960).

The agreement between the present results on restricted associations and the previous ones on free associations was by no means a foregone conclusion. Mednick (1962) considers a flat distribution of free associative responses a sign of creativity. Free associative response variability also increases with age and education (Riegel and Riegel, 1964; Palermo and Jenkins, 1965; Riegel, 1966,1967), whereas the production of Superordinates, Similars, Parts, Functions, etc. converges toward a few, appropriate items (Riegel, Riegel, Smith and Quarterman, 1964; Riegel, Riegel and Levine, 1966). The present results indicate that the negative correlation in response variability be-

tween free and restricted associations varies in magnitude between different languages and with the types of restrictions.

Similar results are obtained when the restricted associative overlaps are analyzed for the different languages. Even though the sum of overlaps of any one task with the remaining six correlates with the number of different responses, this correlation is far from perfect. For instance, French, which is but fourth in response variability, has the lowest response overlap, and, thus, shows the greatest degree of conceptual clarity. Chinese and Spanish have the highest response overlaps as well as the highest response variability.

Again, it would be premature to attribute these results exclusively to differences between the languages. Intelligence and age of Ss may be equally or even more important determinants. The present study has sufficiently shown, however, that restricted associations can be successfully adopted for use in foreign languages and that the results will indicate marked response variability between individuals as well as between languages.

Summary

Twenty-four native speakers of each of the following languages were tested: English, German, French, Spanish, Japanese, Chinese. Most Ss were graduate students in various departments of the University of Michigan; a few were from Michigan State University. There were 12 males and 12 females in each group. The same seven types of restricted associations to the same 35 stimulus nouns were obtained in all languages.

The experience during the test administration and the results indicate the feasibility of applying restricted association tests in foreign languages. There were large interlingual differences in response variability and response differentiation, i.e. in the repetition of responses to the same stimuli under different types of restrictions. The present method also proved useful for quantification of the similarity in meaning or substitutability of alternate translated stimuli.

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Table 1

Type-Token Ratios for Seven Tasks and Six Languages

	English	German	French	Spanish	Japanese	Chinese
Coordinates	.36	.40	.55	.51	.40	.57
Similars	.44	.42	.52	.54	.49	.62
Contrasts	.40	.43	.48	.44	.39	.51
Superordinates	.28	.35	.44	.55	.33	.63
Parts	.39	.42	.47	.47	.52	.63
Functions	.38	.34	.39	.48	.43	.54
Qualities	.64	.52	.64	.68	.62	.71
Average	.41	.41	.50	.52	.46	.60

Table 2

Sums of Overlaps of Any Task with All Others for Six Languages per Stimulus and Subject

	English	German	French	Spanish	Japanese	Chinese
Coordinates	.30	.42	.21	.45	.44	.44
Similars	.21	.28	.15	.36	.26	.36
Contrasts	.15	.26	.14	.25	.31	.34
Superordinates	.10	.10	.12	.23	.14	.19
Parts	.07	.04	.04	.20	.08	.16
Functions	.04	.01	.01	.12	.03	.08
Qualities	.04	.01	.02	.13	.03	.12
Sums	.91	1.12	.69	1.73	1.30	1.71

Table 3

Percentages of Shared Responses to Alternate Translated Stimuli Summed over Seven Types of Restrictions and over Five Stimuli

	German	French	Spanish	Chinese
doctor	32	39	33	30
boy	48	43*	18	13
city	36	31	19	11
stomach	26	17	16	20
square	0	1	1	0
Coordinates	15	8	4	16
Similars	14	28	19	10
Contrasts	21	10	15	19
Superordinates	12	17	19	3
Parts	5	11	8	18
Functions	24	23	26	22
Qualities	8	3	8	12

*Alternate translated stimuli of RIVER rather than BOY were used.

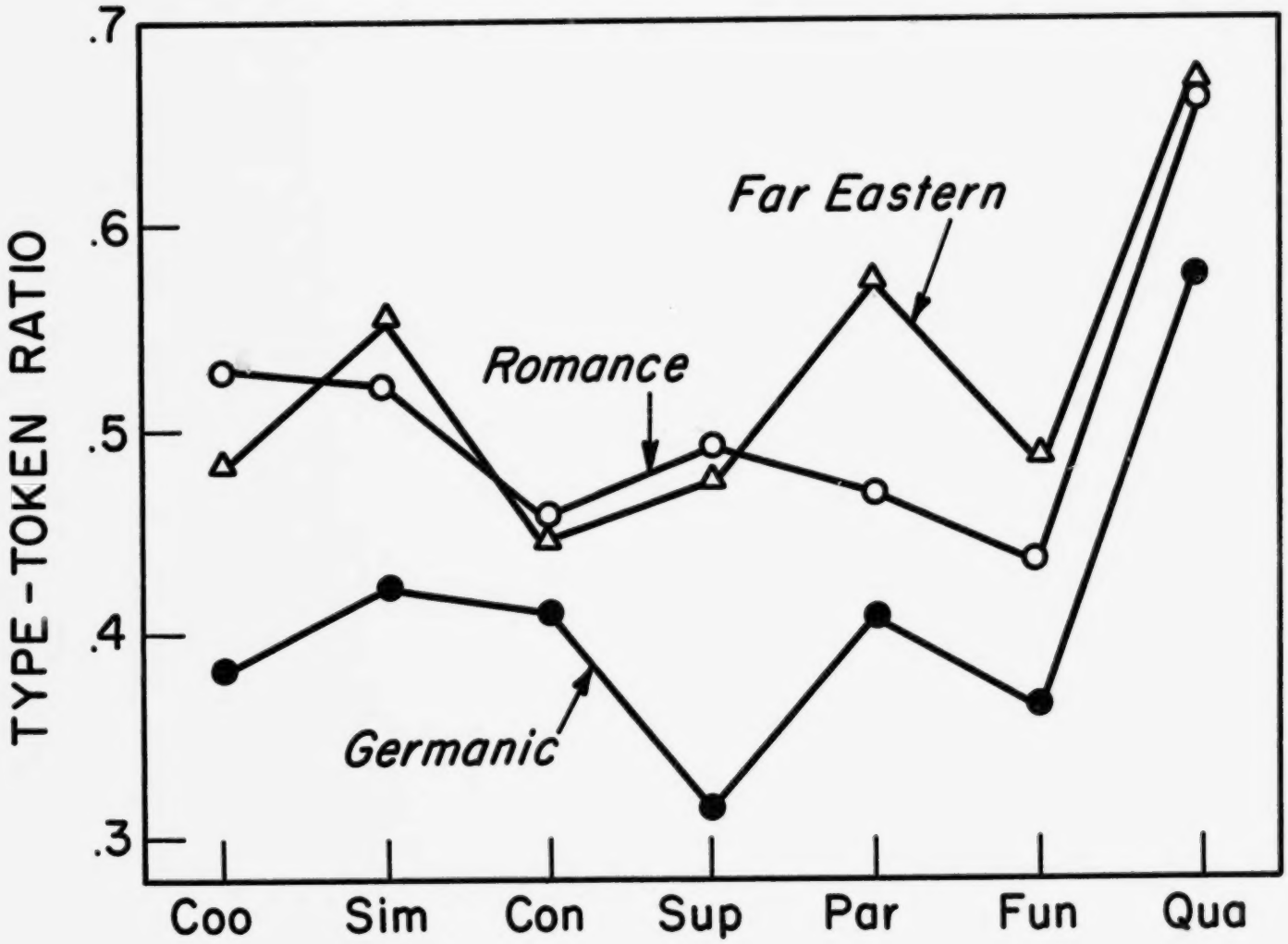

Fig. 1. Average Type Token Ratios for Seven Types of Restricted Associations and Three Language Families.

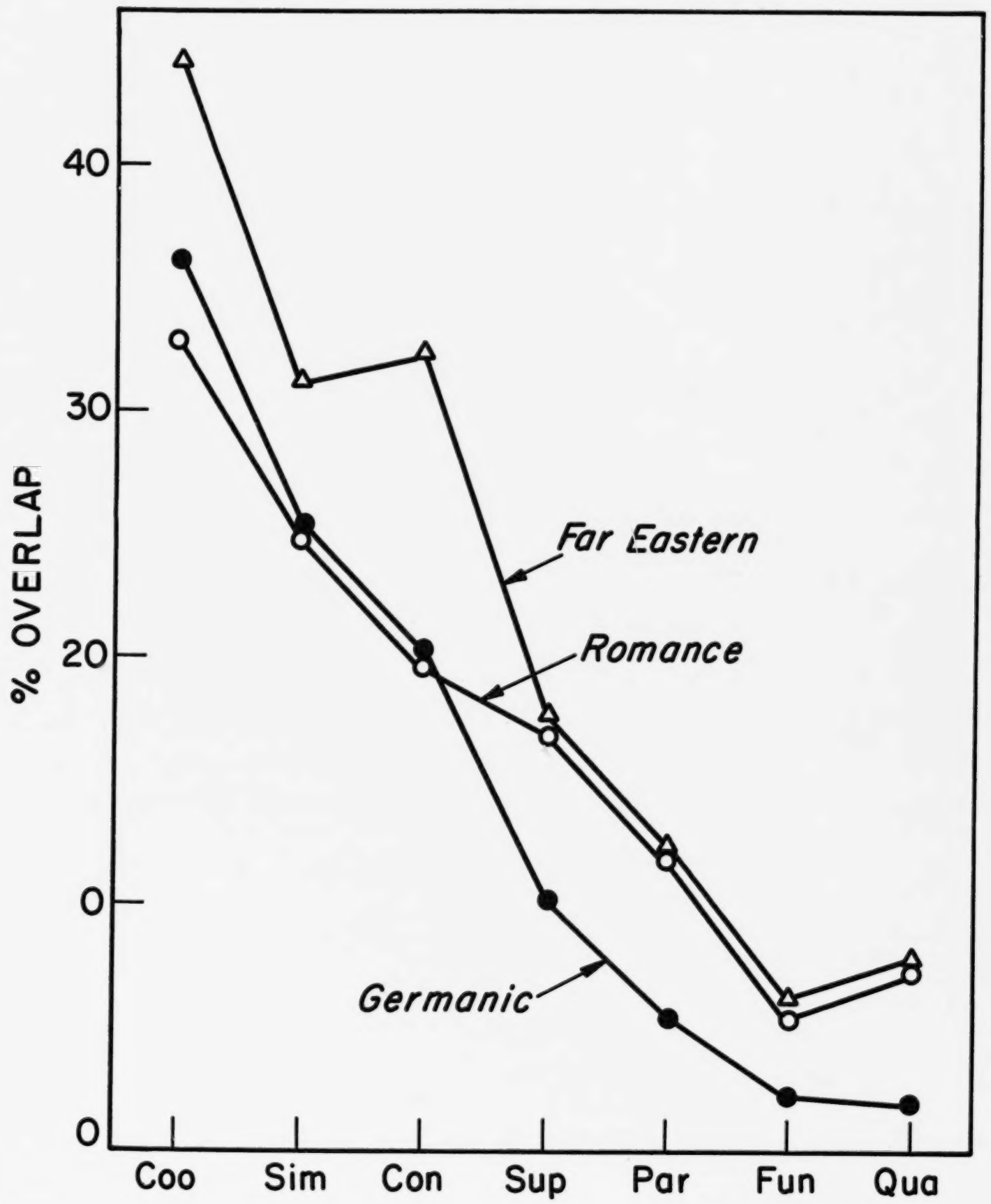

Fig. 2. Average Percent Overlaps for Seven Types of Restricted Associations and Three Language Families.